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The forgotten uses of selenite.

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WE are apt to regard selenite or transparent gypsum as a useless mineral, apart from the very small quantity used in plates for microscope work. It is the object of this paper to show that from the first, to at any rate the seventeenth century in Europe and to the first half of the nineteenth in South America, considerable use was made of it. For the classical period the argument is based upon the identification of *lapis specularis* as mainly, if not entirely, selenite. Most translators render the name as talc or mica, the first word probably a vulgar error for the second, while some admit gypsum to have been included; Bailey in his notes on Pliny considers that two passages suggest gypsum but gives the preference to mica, while Zeitler claims nearly all the passages referred to below for this mineral. Pliny is, of course, our chief authority: I give the relevant passages in Philemon Holland's translation as more in keeping with the greater part of this paper, adding notes and the original Latin where necessary. Book XXXVI, Chapter 22, reads:

'As touching Talc [*specularis*] (which also goeth in the name of a stone) it is by nature much more easie to be clouen into as thin plates as a man will. This kind of glasse stone, the hither part of Spaine only in old time did affoord vs, & the same not all throughout, but within the compasse of a 100 miles, namely about the city Segrobrica: but in these daies we haue it from Cypros, Cappadocia, and Sicilie, and of late also it hath been found in Barbary [Africa: i.e. the province of that name, now Tunis and Tripolitania]: howbeit the best glasse stone comes from Spaine and Cappadocia, for it is the tenderest and carrieth largest pannels, although they be not altogether the clearest, but somewhat duskish. There be also of them in Italy about Bononia [Bologna], but the same be short and small, full of spots also and joined to pieces of flint [*conplexu silicis alligatae*]; and yet it seemeth that in nature they be much like to those that in Spaine bee digged out of pits which they sinke to a great depth. Moreover, there is found of this Talc betweene other stones inclosed in a rocke and lying vnder the ground, which must be hewed out if a man would haue them. But for the most part, this Talc lieth in manner of a vein in the mine by it selfe, as if it were perfectly cut already by nature; and yet was there neuer a piece knowne to be aboue fiue foot long. Some are of opinion, that it is a liquid humour of the earth congealed to an yce after the manner of Crystall. Certes, that it groweth hard into the nature of a stone, may appeare euidently by this, That when any wild beasts are chanced to fall into such pits where this glasse stone is gotten, the very marow of their bones (after one winter) wil be conuerted and turned into a stony substance like to the Talc it selfe.'

He goes on to say that it is 'tender and brittle' [*mollis*], that it will withsta
the sun and the cold, does not age unless injured, and that Juba tells us th
there is a similar stone found in Arabia, clear as glass and used for windo
The only other relevant passage, apart from the uses given below, is IX, 3
where he says that the pearls from India resemble scales of *lapis specular*
This again suggests some form of gypsum rather than mica, especially as bea
of satin-spar are known to have been in use as cheap jewellery in Rome in t
early Empire.

Taking the localities in the order of mention, Segobriga is now Priego in Spai
the Tertiary formation here is full of gypsum, and selenite may also occu
the neighbouring Lias: the same Oligo-Miocene Beds include the Cardona locali
quoted below from Ray's travels.

The gypsum of Cyprus has always been famous: Theophrastus says it is t
best (*Ἡ δὲ γύψος γίνεται πλείστη μὲν ἐν Κύπρῳ*, Cap. LXIV). Pliny also menti
it (XXXVI, 182); he always uses the word gypsum for plaster of Paris—'
obtained by roasting stone (*e lapide coquitur*); the stone cooked must be a k
of alabaster (*lapis non dissimilis alabastritae*); it is recognized that the bes
made from *lapis specularis*'. Here we have proof that the *lapis specularis*, at a
rate of Cyprus, was a form of calcium sulphate; also that mineralogists a
justified in confining 'alabaster' to that compound. The word refers primar
to the handleless vases often made of it: the many similar vases of Egypt a
correctly called *alabastra*, but are made of the carbonate and are therefore n
alabaster. The best description of the Cyprus gypsum I have found is given
Gaudry; he says:

'The gypsum of Cyprus is of many varieties. The most abundant is that which is grain
Some is also found crystallized in lance-heads exactly like that of Montmartre, near Par
this is reserved for fine mouldings. These lance-headed crystals were called by the ancien
specular stone. . . . The island also contains gypsum which is nearly compact and tabul
it can be taken up in large plates. This gypsum is excellent material for the interior floor
of rooms. It wears out much less than might be expected from its softness. It is true th
the eastern nations either walk barefoot, or with very light papouches, and that mats abou
even in the houses of the poor. The flags of Cyprus are very extensively exported. I ha
seen them carried as far as the centre of Mount Libanus.'[1]

Gaudry deals at some length with the minerals of Cyprus and a translati
of his work was issued as a government publication in 1878; he makes no allusi
to mica. He is keenly interested in the classical authors, Theophrastus, D
scorides, and Pliny, and amongst other identifications is the original and we
supported suggestion that the adamas (diamond) was analcime. Cyprus 'diamon
were carefully distinguished from rock-crystal by several authors whom he quo
from the sixteenth and seventeenth centuries, but were confused by Pococ
in the eighteenth.

Cappadocia is a large province in Asia Minor occupied mainly by gypsifero
Tertiary marls, but including some granitic rocks; these no doubt contain mi
but I have not found any reference to comparatively large crystals. Pli
further tells us (XXXVI, 46) that Cappadocia produced a stone with the du
bility (*duritia*) of marble, white and translucent even when veined with yello

[1] Gypsum (from Cyprus?) was used in the palace of Knossos in Crete, 'nearly all the pa
ments being of that material' (Antiq. Journ., 1927, vol. 7, p. 267). The palace was fina
destroyed about 1400 B.C.

from which character it is called *phengites*. It is not improbable that this also is a form of gypsum. He says that Nero used it in the construction of the temple of Fortune and that it admitted light. Bailey objects that gypsum is very soft and unsuitable for building; but it was used for over a thousand years in Cyprus and its durability, which I prefer as a rendering of *duritia*, would call for comment. Doubtless it is the same stone that Strabo mentions (XII, 2), without name—'another place in Cappadocia produced large masses of transparent stone for windows, which was exported'. His Geography antedates Pliny's Natural History by about sixty years and Nero's building by about forty-five. According to Suetonius, Domitian, who died in A.D. 96, had in his palace a portico, where he was accustomed to walk up and down; he decorated the walls with *lapis phengites*, from the lustre of which he was able to see a reflection of anything behind his back, in his case a most desirable precaution. Whatever *phengites* was, it was not phengite.

Both in Sicily and in Africa, which means of course the Roman province, now Tunis and Tripolitania, between Mauretania on the west and Cyrenaica on the east, gypsum in various forms is abundant. In Sicily the best-known locality for good crystals is Girgenti; in North Africa, Sandford mentions the gypsum in the Upper Cretaceous and Tertiary rocks as ubiquitous and assures me (personal letter) that there is no mica.

The Bologna district is formed mainly of Miocene beds with gypsum and is the source of the selenite used in the fifteenth and sixteenth centuries. Pliny's small flakes firmly embedded in silex may possibly have been mica in boulders of schist in the recent gravels, but Bristow states that the Miocene gypsum is accompanied by flints and other minerals.

Arabia probably means Arabia Petraea, i.e. Sinai, of which King Juba I wrote a history. I have not verified Pliny's reference in the existing fragments of Juba's words. Gypsum is abundant in various forms, sometimes highly translucent; apart from such prosaic works of reference as Geological Survey Memoirs, Dr. Thomas Shaw in the first half of the eighteenth century says, 'amongst the fossils the Selenites is observed to shoot itself sometimes for 30 or 40 yards together in a great variety of shapes and colours'.

Thus we have seen that of seven localities mentioned by Pliny for *lapis specularis* all can produce gypsum or selenite; two or three might produce mica, but there is no evidence that any produce crystals of that mineral of a size possible for the chief use mentioned below; the properties mostly suit both minerals, but some *lapis specularis* is burnt to produce plaster of Paris, as has been done with the gypsum of Cyprus from the fourth century B.C. to the present day. It seems certain that there can be no great inaccuracy in assuming that the term means translucent gypsum or selenite, with the proviso that mica may have occasionally been mistaken for that substance. The view is supported by Isidorus, who wrote early in the seventh century; he is the first commentator on Pliny and was specially interested in the meaning of words; he says that there are many kinds of gypsum, the mineral not plaster, of which *lapis specularis* is the best.

It should perhaps be mentioned that both the words *mica* and *selenites* are used by Pliny. The former means a grain or crumb and is applied to rock-salt, marble, &c., not to any specific mineral. The latter, adopted from the Greek of Dioscorides, occurs only once, in the catalogue of gemstones which concludes his

book (XXXVII, 10): it is white, transparent, with a lustre like honey and hol
an image of the moon. It is supposed to originate (*nasci putatur*) in Arabi
This last phrase is a cautious emendation of Dioscorides, who simply says
comes from Arabia. It seems certain that we should translate, not transliterat
the word as moonstone in the sense of adularia; it probably came with oth
gems from Ceylon (Taprobane). The trade in these gems through the Red S
ports (see the 'Periplus of the Erythrean Sea') was beginning to be understood
the Romans in Pliny's time. Many fantastic legends of the connexion betwe
selenites and the moon (Greek, σελήνη) grew up later; a full history is given
Adams in his chapter on 'Quaint stories and beliefs' with the appropriate su
title 'mineral moonshine'. That the medieval confusion makes any scientif
identification of the mineral hopeless is indicated by the opening words
Marbodus's account: 'Nor must we pass the Selenites by, Whose hues with gra
or verdant jasper vie.'

For the classical use of the material, the most important passage, sinc
gives a date, is Seneca, Epistle XC: 'We know that certain devices have come
light only within our own memory, such as the use of window-panes [*specular*
as opposed to *fenestra*, which is the opening in the wall] which admit the cle
light through a translucent slab (*per lucente testa*).' Seneca died in A.D. 65.
his better-known letter about Scipio's villa (Ep. LXXXVI) he commends th
simplicity of his bath-house with mere chinks for ventilation as opposed to th
modern luxury of glazed windows, behind which one could sun-bathe and acqui
tan as well as wash! There are several allusions to such panes, though some lea
it vague whether stone or glass was used. Juvenal (IV, 20) has an amusin
passage about a gourmand who gave a huge price for a mullet and ate it himsel
it would have been better if it had been a present for a courtesan, carried abo
the streets in a sedan chair with wide specularia. Pliny, the Younger, nephe
of the naturalist, described his country house; it had a little hall with glaze
windows, as had also the summer-house or gazebo in the garden. Some interestin
passages are quoted by Nixon, but I have not been able to verify the first b
reference to the original texts. Philo Judaeus in his account of his embassy
the Emperor Caligula says that the Emperor broke off the discussion and hurrie
away into a spacious hall where he ordered the windows to be shut on every sid
these were constructed with plates of *lapis specularis* almost as transparent
glass, which admitted the light but excluded the wind and the heat of the su
The embassy was in A.D. 40. Again, he quotes Lactantius, who died in 325, to th
effect that light is admitted through the eye as though through windows of cle
glass or *lapis specularis* (De Opifice Dei, VIII).

From the younger Pliny's gazebo it is an easy step to greenhouses. Marti
(VIII, 14) speaks of fruit trees protected by *specularia*, to admit the sun an
keep out the cold winds and also (VIII, 68) of grapes similarly protected b
transparent stone (*perspicua gemma*), covered but not concealed, like the charm
of a lady in a silk dress. Cucumbers should be grown in wheeled frames so tha
they can be moved into the sunniest spots; even so they must be protected b
specularia. In this way the Emperor Tiberius was enabled to have cucumbe
all the year round (Columella XI, 398, and Pliny XIX, 64). Beehives were ofte
made with windows of *lapis specularis* so that the bees could be watched at wo
within. As Pliny (XXI, 20) uses the word *lapis* here, it seems probable that th

ucumber frames also were of this material rather than glass. He also mentions he use of the stone in small fragments to sprinkle on the arena and produce a litter (XXXVI, 22), while Petronius says that the floor of Trimalchio's dining-oom was spread with a mixture of sawdust dyed with saffron and cinnabar, and f ground-up *lapis specularis*. Here again the mineral cannot be mica, which an only be ground in a ball-mill, since it lubricates the surfaces of millstones nd would not be separated from the quartz of powdered mica-schist for such purpose. Isidorus refers to the earlier uses and says that *lapis specularis* is a nost delightful addition to a head-dress (*corona*); this probably implies glittering articles and may be compared to the powdered head-dresses and wigs of a much ater period.

Some of the uses mentioned above seem to have died out in the Dark Ages. The Geoponica, composed originally by Cassianus Bassus about A.D. 600 but evised and published for the Emperor Constantine Porphyrogenitus about A.D. 950, gives very full details for growing cucumbers, including methods of getting early fruit, but makes no mention of frames with either glass or *lapis* anes. But in Renaissance times the use of selenite for window-panes was videspread.

The premier author is, of course, Georg Bauer, better known by his Latin name Agricola, who has been called the father of mineralogy. His 'Bermannus,' a dialogue on minerals, is dated 1529. He says that *lapis specularis* is now called Mary's Glass and then quotes Pliny's account, incidentally mentioning 'Aphrica' i.e. Africa]: 'on account of the properties described it is used in windows no otherwise than glass, as in the old Church of Marsiburg (Thuringia). It is found n Germany so plentifully that they get it in cart-loads, and also in Gaul.' There ollows an account of its use in medicine, chiefly for stopping bleeding, external r internal as in dysentery; this is mainly taken from Dioscorides and Galen. His ater 'De natura fossilium' (1546) adds very little except, what might have been uessed from the medicinal use, '*lapides quaedam obturant viscera, ut gypsum, ut apis specularis*'. He is responsible for the statement, universally adopted, hough as quoted above probably wrong originally, that selenites is gypsum.

The 'Musaeum metallicum of Aldrovandus' was published by his pupil Bartholomaeus Ambrosinus in 1648. It is impossible to say how much is the riginal material and how much is editorial comment: in translating the following xtracts I have had the assistance of Dr. Eichholz of Bristol University.

'Since *Lapis specularis* is easily split into thin plates, it fulfilled in antiquity the function f glass as a means of filling in windows in buildings, just as it does even to-day in districts here it is found most commonly. Consequently "*speculare*" and "*specularium*" are terms pplied to a kind of window so designed as to admit light into a building and at the same time xclude damaging rain and wind. Windows of this kind used to be made in winter and emoved in the summer. As a matter of fact in Italy and particularly at Bologna, the home f Aldrovandus, where it is quarried in great quantities, this stone is used even now during he winter in show rooms. The merchants fashion casements of parchment and insert in hem strips of selenite. In this way they protect themselves from the inconveniences of the old weather and also watch the public as it passes by.'

We must remember that window-glass was then a rare and costly luxury. Thirty years later Edward Brown refers to Bohemian glass, saying that in Prague the windows of palaces and fair houses are of glass and look not so tatterdly as he paper windows of Florence'. Ambrosinus then quotes Martial, Juvenal, and

Agricola, adding a church at Korswyk in Saxony as having, on the last's authorit windows of *lapis specularis*. Though I have not noted any other German localiti the general use of the terms Marienglas or Our Lady's glass seems to imp familiarity with the material; Rudler mentions that in the Permian rocks close Reinhardsbrunn there is a grotto called the Marienglashöhle. The term comparable with the constantly used 'Muscovy glass' for our muscovite mi After giving the passages I have already used from Pliny and Columella, t account in Aldrovandus continues 'nor should we draw a veil of silence over t statement which Andreas Bacchus has entrusted to his memoirs regarding t employment of the specular stone in public baths. A transparent slab (*testa* Seneca above) of the stone would be placed in front of the baths and, reflect in its pellucid depths, the naked persons of the bathers within would app larger than life and almost like giants'. The quotation is presumably from And Baccio or Baccius, whose 'De gemmis et lapidibus' was published in 1603, b according to Adams, in Italian at an earlier date. I have not been able to see book and check the reference; the picture given presents certain obscurities, perhaps that is as well! Referring to Pliny's beehives he says that 'even in time some people have constructed hives with this material, in which one can to advantage how much the bees have produced on any one day'. The remain of the passage refers to magical properties and ends with the bold statem 'this I consider to be nonsense'. We are also indebted to Aldrovandus for t illustration mentioned below.

For Cyprus, Richard Pococke included a chapter on Natural History, publish in 1745: 'The soil of Cyprus is for the most part rocky; there are in it many ent hills of talc or gypse, some running in plates and another sort in shoots, li crystal; the latter is used in many parts especially at Larnica as stone for bui ing.' Jeffrey, in his recent archaeological report, says that the church of Catherine at Nicosia has windows 'filled in with the curious perforated gypsu slabs in place of glass', as has also the cathedral of Famagusta and a medie monastery. The date when these slabs were inserted is unknown.

In 1664 Francis Willughby was travelling in Spain; his account is preserv with John Ray's Travels. On September 1 he records 'near *C. de Creux* upon t mountains they find a kind of *Selenitis* which may be cut or slit into very t plates like the common *Muscovy* glass' [mica]; and later 'we came to *Cardona* we viewed the mountain of salt . . . not far from this there is another mount of salt where the salt sticks to the rocks, and is most of it tinctur'd with red amongst this red salt there is a kind of *Selenitis* (which some call ising-glass a the *Italians Gesso* from the *Latin* word *Gypsum* signifying Chalk, because w burnt it is turned into a white *calx*) which naturally roches into parallelipedu of the figure of a lozenge'. Though it is not definitely stated, the passage stron suggests that the mineral was used.

No doubt the increase of glass manufacture soon ousted the use of selen for windows in the old world, except Cyprus. In parts of South America it c tinued. Speaking of the Permo-Trias of Bolivia, David Forbes in 1861 wro 'The gypsum beds are frequently of great thickness and extent . . . and prod abundance of fine alabaster extensively used for the purposes of architecture (example, the fountain in the Alameda of La Paz, &c.): some of the slabs of t material are so transparent that tablets of it, until very lately, have been

eneral use in this part of Bolivia as a substitute for window-glass: I noticed hat the windows of the church at Pisacoma were formed of this material in slabs f about two inches thick.' Clear gypsum invariably accompanies the copper res, as does some of the Cyprus material.

One point arising out of the above deserves discussion. It has been suggested y John Woodward that in the use of selenite lies the reason for the use of liamond-shaped or diamond-wise placed panes of glass in windows. Some xplanation of this ancient custom is necessary, since it involves the needless rouble of a border of half-panes in order to fill a rectangular space. Similar abour-wasting habits can frequently be traced back to a former use of a material hat necessitated them. Innate conservatism causes a lag in adaptation to the ew conditions. Now a diamond shape, or to use Willughby's word a paralleli-ipedum or lozenge, is almost inevitable when a cleavage plate of selenite is used. That it actually was so is shown by a specimen of such a pane of Roman imperial late dug up in the Campagna and figured in Aldrovandus; this is a lozenge with liagonals $6\frac{1}{2}$ by 3 inches, assuming that the figure is natural scale. His figures f fossils (in the modern sense) show that this was his custom. In the first century elenite and glass panes were introduced almost simultaneously, but the former lid not control the shape of the latter. Mr. J. Allen of the British Museum tells me that in the tepidarium of the villa of Diomedes at Pompeii four panes of glass were found still in a wooden frame; they were squares of about $10\frac{1}{2}$ inches. All he available evidence points to rectangular glass panes and even in this country May has described what is almost certainly a stone mould for making window-panes at the Roman glass works of Wilderspool near Warrington; the panes were rectangular, 12 by 8 inches.

On the other hand, when window glass began to be common in the fifteenth nd sixteenth centuries, selenite panes were in considerable use in the very ountries, Germany and northern Italy, where glass making began to flourish. The only other attempt to explain diamond-shaped panes that I have come across s in Brigg's 'History of building crafts'. 'The background (of coloured windows) vas divided into diamond-shaped quarries, this form probably having been uggested by the light "lattices" of inter-lacing twigs that preceded glazing in he windows of earlier cottages.' But this does not explain why the lattice of wigs should be diagonal instead of parallel to the sides of the frames. The con-exion with selenite must at present, and may always, remain a plausible but nproven suggestion.

To what extent gypsum or selenite panes still exist I do not know. It is a point hich few authors, whether antiquaries or geologists, are likely to mention, and he time is not favourable for research or inquiry in either Germany or Italy; here is reason to believe that some survive in the latter. King, in his 'Natural istory of gems' published in 1867 says (footnote *s.v.* Alabastrites) that 'in certain ery ancient Italian churches (as San Miniato) the windows are filled in with ngle slabs of a translucent stone which is not Talc, and thus, probably, preserve n example of this Phengites'. Maurice Hewlett describes the church of San iniato near Florence: 'then there is the upper Choir which contains the Tribune . . its windows are of sliced onyx'. The word onyx, when not referring to a liceous mineral, normally means stalagmite or travertine, but it seems more robable that the material in San Miniato is the gypsum of Volterra, 30 miles

distant. In any case the panes are clearly mineral, not glass. A visitor as recent as 1938 has told me that she noticed the delightfully soft effect of the light.

Since this paper was read, Dr. R. W. Pocock (of the Geological Survey, descendant of Dr. Richard Pococke quoted above) tells me that he saw windo panes of fine alabaster in one of the ancient churches of Rome.

Also I am indebted to Mr. R. C. Spiller for the information that the miner collection in the museum at Oxford contains a plate of selenite labelled 'Cyprus' it is a rhomb with sides 10 and $5\frac{1}{2}$ inches, the obtuse angle between the about 115°. It is $1\frac{1}{4}$ inches thick; it is colourless and transparent, with slig yellow zoning near the edges. Obviously such material would be quite suitab for use in windows.

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Sixteenth list of new mineral names.[1]

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Abkhazite. N. E. Efremov, 1940. Trans. Inst. Geol. Sci., Acad. Sci. USSR 1938 [i.e. 1940], no. 11 (Min. Geochem. Ser., no. 3), p. 37 (абхазит). A monoclinic amphibole-asbestos in which the ratio (Mg,Fe) : Ca is 4 : 3 (instead of 5 : 2 as in tremolite and actinolite). Named from the province Abkhaziya (Абхазия) in Georgia, Transcaucasia. [M.A. **8**–2.]

Ablykite. I. D. Sedletzky and S. M. Yusupova, 1940. Compt. Rend. (Doklady) Acad. Sci. URSS, vol. 26, p. 244 (Ablick clay, ablikite), p. 946 (ablykite). A clay mineral close to halloysite containing some K, Mg, and Ca, with distinctive thermal and X-ray characters. $RO.2R_2O_3.5SiO_2.6H_2O$. Named from the locality Ablyk, Uzbekistan. [M.A. **8**–147, 342.]

Alkali-montmorillonite. W. Noll, 1936. *See* Calcium-montmorillonite.

Barbertonite. C. Frondel, 1940. Amer. Min., Program and abstracts December 1940, p. 6; Amer. Min., 1941, vol. 26, pp. 196, 311. Hydrous basic carbonate of magnesium and chromium, $Cr_3Mg_6(OH)_{16}CO_3.4H_2O$, as hexagonal scales dimorphous with the rhombohedral stichtite. Named from the locality Barberton, Transvaal. [M.A. **8**–51, 100.]

Barium-nepheline. A. S. Ginzberg, 1915. Ann. Inst. Polytechn. Pétrograd, vol. 23. Artificially prepared hexagonal $BaAl_2Si_2O_8$, a high-temperature analogue of celsian. [M.A. **2**–153; Min. Mag. **26**–243.]

Barium-sanidine. E. S. Larsen *et alii*, 1941. Bull. Geol. Soc. Amer., vol. 52, p. 1849 (barium sanidine). A variety of sanidine containing BaO 5% from the Highwood Mountains, Montana. [M.A. **8**–243.]

Bellingerite. H. Berman and C. W. Wolfe, 1940. Amer. Min., vol. 25, p. 500. Hydrous copper iodate, $3Cu(IO_3)_2.2H_2O$, as green triclinic crystals from Chuquicamata, Chile. Named after Mr. Herman Carl Bellinger, vice-president of the Chile Exploration Company. [M.A. **8**–3.]

Bemmelenite. F. V. Chukhrov, 1936. [Colloids in the earth's crust (Russ.). Acad. Sci. USSR, 1936, p. 103.] O. M. Shubnikova, Trans. Inst. Geol. Sci., Acad. Sci. USSR, 1938 [i.e. 1940], no. 11 (Min. Geochem. Ser., no. 3), p. 7 (Беммелениг Bemmelenite). Colloidal ferrous carbonate, the amorphous analogue of chalybite. Named after Prof. Jakob Maarten van Bemmelen (1830–1911) of Leiden, who described the material occurring in peat deposits (Zeits. Anorg. Chem., 1900, vol. 22, p. 316).

[1] Previous lists of this series have been given every three years at the ends of vols. 11–22 (1897–1940) of this Magazine. The 1506 names in the first ten lists are included in one alphabetical arrangement in the General Index (1926) to vols. 11–20 (1895–1925). References to 'Mineralogical Abstracts' are given in the form [M.A. **8**–2].

Bradleyite. J. J. Fahey, 1941. Amer. Min., vol. 26, p. 646. A double salt of sodium phosphate and magnesium carbonate, $Na_3PO_4.MgCO_3$, as very fine-grained material in saline oil-shale from Wyoming. Named after Dr. Wilmot Hyde Bradley (1899-) of the United States Geological Survey. [M.A. 8–229.]

Brammallite. F. A. Bannister, 1943. Min. Mag., vol. 26, p. 304. A micaceous mineral differing from illite (15th List) in containing soda in excess of potash, also called sodium-illite; from crevices in coal-measure shales from Llandebie, South Wales. Named after Dr. Alfred Brammall (1879-) of the Imperial College of Science and Technology, London.

Brodrickite. H. C. Dake, 1941. The Mineralogist, Portland, Oregon, vol. 9, p. 443. A micaceous mineral, apparently an alteration product of phlogopite, from Bolton, Massachusetts. Named after Mr. John H. Brodrick, of Clinton, Massachusetts, who collected the material. [M.A. 8–230.]

Brownmillerite. E. Spohn, 1932. [Dissertation, Berlin, 1932]; Zement, Charlottenburg, 1932, vol. 21, p. 702 (Brownmiller'sche Verbindung), p. 732 (Brownmillerit). S. Solacolu, Zement, 1932, vol. 21, p. 301 (Brownmillerit). Tetracalcium aluminoferrite, $4CaO.Al_2O_3.Fe_2O_3$, first prepared by W. C. Hansen, L. T. Brownmiller, and R. H. Bogue, Journ. Amer. Chem. Soc., 1928, vol. 50, p. 396, and afterwards detected in Portland cement, and later in dolomite-silica fire-bricks (J. R. Rait, Second Rep. Refractory materials, Iron and Steel Inst., 1942, Special Rep. no. 28, p. 66; Nature, London, 1942, vol. 150, p. 134). Named after Dr. Lorrin Thomas Brownmiller (1902–) of the Alpha Portland Cement Company, Easton, Pennsylvania.

Cadwaladerite. S. G. Gordon, 1941. Notulae Naturae, Acad. Nat. Sci. Philadelphia, no. 80. Hydrous basic aluminium chloride, $Al(OH)_2Cl.4H_2O$, as amorphous grains in halite from Cerro Pintados, Chile. Named after Charles M. B. Cadwalader, President of the Academy of Natural Sciences of Philadelphia. [M.A. 8–187.]

Calcium-montmorillonite. W. Noll, 1936. Chemie der Erde, vol. 10, p. 137 (Ca-Montmorillonit). An artificially prepared clay mineral with calcium in place of magnesium. I. D. Sedletzky, Compt. Rend. (Doklady) Acad. Sci. URSS, 1940, vol. 26, p. 154 (calcium montmorillonite), records its presence in Russian saline soils and gives a formula $(OH)_8(Al_2Ca_3)Si.CaSi_4O_{10}$, as distinct from Mg-montmorillonite, $(OH)_8(Al_2Mg_3)Si.MgSi_4O_{10}$. W. Noll (pp. 135, 137) also mentions Mg-, Na-, K-, and alkali-montmorillonites. U. Hofmann and W. Bilke, Kolloid-Zeits., 1936, vol. 77, pp. 243, 244, obtained Ca-, H-, and Na-montmorillonites as base-exchange products of bentonitic montmorillonite. [M.A. 6–353, 7–97, 8–146.]

Calingastite. V. Angelelli and R. A. Trelles, 1938. [Bol. Obras Sanitarias de la Nación, Buenos Aires, nos. 8-10, p. 40.] S. G. Gordon, Notulae Naturae, Acad. Nat. Sci. Philadelphia, 1941, nos. 89 and 92. A zinciferous variety of melanterite $(Fe,Zn,Cu)SO_4.7H_2O$, containing FeO 16·67, ZnO 8·42, CuO 1·29%, from sulphate deposits between San Juan and Calingasta, Argentina. Named from the locality. Cf. zinc-copper-melanterite (9th List). [M.A. 8–187.]

Clinobarrandite. D. McConnell, 1940, Amer. Min., vol. 25, p. 719. Hydrous aluminium ferric phosphate, $(Al,Fe)PO_4.2H_2O$, shown by X-rays to be mono-

clinic, and so dimorphous with the orthorhombic barrandite with which it intimately intermixed, from Manhattan, Nevada. [M.A. **8**–50.]

Cobalt-löllingite. R. J. Holmes, 1942. Science, New York, vol. 96, p. (cobaltiferous löllingite), p. 92 (cobalt-löllingite). Synonym of safflorite, wh always contains iron, $(Co,Fe)As_2$, and gives the same X-ray pattern löllingite. [M.A. **8**–380.]

Columbomicrolite. J. E. de Villiers, 1941. Amer. Min., vol. 26, p. 5 Microlite containing niobium in place of tantalum, from Eshowe, Natal. [M. **8**–188.]

Cryptomelane. W. E. Richmond and M. Fleischer, 1942. Amer. Min., vol. p. 607. L. S. Ramsdell, ibid., p. 611. Potassium-manganese manganate givi an X-ray pattern distinct from psilomelane (Ba-Mn manganate). Named fr κρυπτός, hidden, and μέλᾶς, -ᾶνος, black. [M.A. **8**–310.]

Djalmaite. C. P. Guimarães, 1939. Ann. Acad. Brasil. Sci., vol. 11, p. (Djalmaita), p. 350 (Djalmaíta). Amer. Min., 1941, vol. 26, p. (Djalmaite). Hydrous tantalate of uranium, as yellow octahedra from Bra The tantalum analogue of betafite. Named after Dr. Djalma Guimarães, of Geological and Mineralogical Survey of Brazil. [M.A. **8**-2, 100.]

Donbassite. E. K. Lazarenko, 1940. Compt. Rend. (Doklady) Acad. URSS, vol. 28, p. 519 (donbassites). A group of hydrous alumino-silicat $H_{14}Al_8Si_5O_{29}$, &c., with small amounts of Fe, Mg, Ca, Na, closely resembli pyrophyllite. Previously described as α-chloritite (7th List). Named from t locality, Donetz basin, Ukraine. [M.A. **8**–53.]

Elkonite. M. L. Tainter, G. Kulchar, and A. B. Stockton, 1940. Journ. Am Pharmac. Assoc., vol. 29, p. 306. A colloidal clay from Elko, Nevada. [M.A. **8**–

Endellite. L. T. Alexander, G. T. Faust, S. B. Hendricks, H. Insley, a H. F. McMurdie, 1943. Amer. Min., vol. 28, p. 1. The 'hydrated halloysi of S. B. Hendricks [M.A. **7**–422], $H_4Al_2Si_2O_9.2H_2O$; the name halloysite bei incorrectly limited to $H_4Al_2Si_2O_9$, which has been called metahalloysite [14 List, M.A., **6**–181, **7**–96]. Named after Prof. Kurd Endell (1887–) of the Techni High School, Berlin, incorrectly stated to be one of the discoverers of the materi Compare hydrohalloysite and hydrokaolin (15th List). [M.A. **8**-342.]

Endiopside. H. H. Hess, 1941. Amer. Min., vol. 26, p. 519. A contraction enstatite-diopside (W. Wahl, 1906; 5th List) for a clinopyroxene intermedi in composition between enstatite and diopside. [M.A. **8**–234.]

Ferrithorite. I. E. Starik, L. L. Kravchenko, and O. S. Melikova, 19 Compt. Rend. (Doklady) Acad. Sci. URSS, vol. 32, p. 254. A ferriferous (Fe_2 12·02, FeO 3·55 %) variety of thorite from Kirghizia. The same as ferrothor (11th List). [M.A. **8**–302.]

Ferri-turquoise. E. E. Fairbanks, 1942. The Mineralogist, Portland, Oreg vol. 10, p. 44. A variety of crystallized turquoise containing Fe_2O_3 5 %, fr Lynch, Virginia. [M.A. **8**–270.]

Ferroaugite. H. H. Hess, 1941. Amer. Min., vol. 26, pp. 517, 577, *passi* A variety of augite rich in iron and distinct from pigeonite. [M.A. **8**-234.]

Ferrohydrite. F. V. Chukhrov, 1936. [Colloids in the earth's crust (Russ.), Acad. Sci. USSR, 1936, p. 97.] O. M. Shubnikova, Trans. Inst. Geol. Sci., Acad. Sci. USSR, 1938 [i.e. 1940], no. 11 (Min. Geochem. Ser., no. 3), p. 6 (Феррогидрит, Ferrohydrite). Colloidal hydrous iron oxide occurring in the mud of salt lakes.

Ferrohypersthene. H. H. Hess and A. H. Phillips, 1940. Amer. Min., vol. 25, p. 285. Members of the enstatite-orthoferrosilite series between hypersthene (30–50 mol. % enstatite) and orthoferrosilite (12–0 % En). Compare iron-hypersthene (14th List). [M.A. **8**–18.]

Ferrosalite. H. H. Hess, 1941. Amer. Min., vol. 26, p. 518. A variety of the clinopyroxene sahlite (= salite), rich in iron. [M.A. **8**–234.]

Garnetoid. D. McConnell, 1941. Amer. Min., Program and Abstracts, December 1941, p. 18; Amer. Min., 1942, vol. 27, p. 452; Science, New York, 1943, vol. 97, p. 99. Substances (silicates, phosphates, &c.) which have structures similar to garnet, including hydrogarnet (q.v.), grossularoid (q.v.), plazolite, tilleyite, and berzeliite. [M.A. **8**–343.]

Grossularoid. D. S. Belyankin and V. P. Petrov, 1941. Amer. Min., vol. 26, p. 450 (grossularoid). Group name for hibschite and plazolite, $3CaO.Al_2O_3.2SiO_2.2H_2O$, related to and associated with grossular, in which $2H_2O$ replaces SiO_2. Compare garnetoid and hydrogarnet. [M.A. **8**–145.]

Hectorite. H. Strese and U. Hofmann, 1941. [Zeits. Anorg. Chem., vol. 247, p. 65.] U. Hofmann and A. Hausdorf, Zeits. Krist., 1942, vol. 104, pp. 266, 274 (Hectorit). Magnesium-bearing bentonite (montmorillonite) from Hector, California. Synonym of magnesium-bentonite (15th List). Named from the locality. Not the hectorite of S. H. Cox, 1882.

Helictite. [H. C. Hovey, 1882. Celebrated American caverns. Cincinnati, p. 186]; Funk and Wagnalls, Standard Dictionary, 1893–5. L. C. Huff, Journ. Geol. Chicago, 1940, vol. 48, p. 641. Crooked and branching formations of calcite or aragonite in limestone caverns, as distinct from straight stalactites and stalagmites. Named from ἕλιξ, a spiral, ἑλικτός, twisted. Compare anemolite (3rd List). [M.A. **8**–202.]

Hochschildite. R. Herzenberg, 1942. Fac. Nac. Ingen. Univ. Oruro (Hochschildita). Hydrous lead stannate, $PbSnO_3.5–6H_2O$, with some Fe and Si, as a yellow, earthy or scaly alteration product of teallite from Bolivia. Named after Dr. Mauricio Hochschild of Oruro. [M.A. **8**–310.]

Hydrogarnet. E. P. Flint, H. F. McMurdie, and L. S. Wells, 1941. Journ. Research U.S. Bur. Standards, vol. 26, p. 13 (garnet-hydrogarnet series), p. 14 (hydrogarnets). Hydrous calcium aluminate ($3CaO.Al_2O_3.6H_2O$) and calcium ferrite ($3CaO.Fe_2O_3.6H_2O$), present in hydrated Portland cement. They are cubic and form a complete series of mixed crystals with grossular ($3CaO.Al_2O_3.3SiO_2$) and andradite ($3CaO.Fe_2O_3.3SiO_2$); plazolite ($3CaO.Al_2O_3.2SiO_2.2H_2O$; 9th List) is an intermediate member. Compare grossularoid and garnetoid. [M.A. **8**–101, 146.]

Hydroloparite. V. I. Gerasimovsky, 1941. Synonym of metaloparite (q.v.).

Hydromontmorillonite. I. D. Sedletzky, 1940. Compt. Rend. (Doklady)

Acad. Sci. URSS, vol. 26, p. 241. An assumed intermediate stage in the pass... from montmorillonite gel into montmorillonite. [M.A. 8–146.]

Hydrotungstite. P. F. Kerr and F. Young, 1940. Amer. Min., Program a... Abstracts, December 1940, p. 9; Amer. Min., 1941, vol. 26, p. 199. Hydr... tungstic oxide, $WO_3.2H_2O$, similar in appearance but distinct from tungst... ($WO_3.H_2O$); from Oruro, Bolivia. [M.A. 8–52.]

Inderborite. G. S. Gorshkov, 1941. Compt. Rend. (Doklady) Acad. S... URSS, vol. 33, p. 255 (inderborite). Hydrous calcium and magnesium bor... $CaMgB_6O_{11}.11H_2O$, as monoclinic crystals from the Inder borate depo... Kazakhstan. Named from the locality. *See* Metahydroboracite. [M.A. 8–34...

Iron-skutterudite. R. J. Holmes, 1942. Science, New York, vol. 96, p. ... Synonym of arsenoferrite (6th List), which gives the same X-ray pattern... skutterudite, $(Co,Fe)As_3$. [M.A. 8–380.]

Ishkulite. G. P. Barsanov, 1941. [Compt. Rend. (Doklady) Acad. S... URSS, vol. 31, p. 468], abstract in Amer. Min., 1942, vol. 27, p. 62. A variet... magnetite containing Cr_2O_3 11·19 % from lake Ishkul (Ишкуль), Ilmen M... southern Ural. Named from the locality. Not to be confused with ishkyl... (14th List). [M.A. 8–230.]

Kalsilite. F. A. Bannister, 1942. Min. Mag., vol. 26, p. 218. A. Holmes, ibi... p. 197; Geol. Mag., 1942, vol. 79, p. 226. A polymorphous form of potassi... aluminosilicate, $KAlSiO_4$, hexagonal, but differing from kaliophilite in its X-r... pattern; occurs in potash-rich volcanic rocks from Uganda and Italy. Nam... from the chemical formula. [M.A. 8–318.]

Kurnakovite. M. N. Godlevsky, 1940. Compt. Rend. (Doklady) Acad. S... URSS, vol. 28, p. 638. Hydrous borate of magnesium, $2MgO.3B_2O_3.13H_2O$, white granular (monoclinic) masses from Inder, Kazakhstan. Named aft... N. S. Kurnakov (Н.С. Курнаков), member of the U.S.S.R. Academy of Science... [M.A. 8–53.]

Lamprobolite. A. F. Rogers, 1940. Amer. Min., vol. 25, p. 826; ibid., 194... vol. 26, p. 201. To replace the names 'basaltic hornblende', basaltine, a... oxyhornblende (13th List) for the black lustrous crystals of hornblende rich... ferric iron, with high refringence and birefringence and strong pleochroism, ... volcanic rocks (not only basalts). Named from *λαμπρός*, brilliant, and *βολίς*, ... missile. [M.A. 8–51.]

Lok-batanite. S. A. Kovalevsky and A. T. Kochmarev, 1939. [Tru... Voprosam Neftyanoi Geol., 1939, p. 7; Khim. Referat. Zhur., 1940, no. 2, p. 2... Chem. Abstr. (Amer. Chem. Soc.), 1942, vol. 36, p. 1874. An organic materi... from the Lok-Batan mud volcano.

Magnesium-montmorillonite. *See* Calcium-montmorillonite.

Manasseite. C. Frondel, 1940. Amer. Min., Program and Abstracts, Decem... ber 1940, p. 6; Amer. Min., 1941, vol. 26, pp. 196, 310. Hydrous basic carbonat... of magnesium and aluminium, $Al_3Mg_6(OH)_{16}CO_3.4H_2O$, as hexagonal scal... dimorphous with the rhombohedral hydrotalcite. Named after Ernesto Manass... (1875–1922) of Firenze. [M.A. 8–51, 100.]

Manganese-sicklerite. P. Quensel, 1937. Geol. För. Förh. Stockholm, vol. 59, pp. 85, 96 (Mn-sicklerite). B. Mason, ibid., 1941, vol. 63, p. 139 (Mn-sicklerite). Amer. Min., 1937, vol. 22, p. 876 (manganese sicklerite). The original sicklerite derived from lithiophilite from California (6th List), as distinct from ferri-sicklerite derived from triphylite, from Varuträsk, Sweden (14th List), and containing manganese in excess of iron in the formula $(Li,Mn'',Fe''')PO_4$. [M.A. 3–486, 8–181.]

Mangan-hydroxyapatite. B. Mason, 1941. Geol. För. Förh. Stockholm, vol. 63, p. 279 (mangan-hydroxyapatite), p. 281 (Mn-hydroxyapatite). Hydroxyapatite (6th List) = hydroxylapatite (15th List) containing manganese (MnO 7·5 %), from Varuträsk, Sweden, $(Ca,Mn,Fe)_{10}(PO_4)_6(OH)_2$. [M.A. 8-311.]

Manganoxyapatite. B. Mason, 1941. Geol. För. Förh. Stockholm, vol. 63, p. 283 (manganoxyapatite), p. 383 (mangan-oxyapatite). Synonym of mangan-voelckerite (15th List). [M.A. 8–343.]

Mellorite. W. Hugill, 1939. [Bull. British Refractories Research Association, no. 49, p. 15]: Journ. Iron & Steel Inst., 1941, vol. 144 (1941, no. 2), p. 257 P; Trans. Brit. Ceramic Soc., 1942, vol. 41, p. 50. Silicate of ferric iron, calcium, &c., approaching garnet in composition, but with optical properties similar to those of an orthorhombic pyroxene. Formed by the action of basic slag on silica brick in a steel furnace. Named after Dr. Joseph William Mellor (1869–1938). [M.A. 8–279.]

Meta-alunogen. S. G. Gordon, 1942. Notulae Naturae, Acad. Nat. Sci. Philadelphia, no. 101, p. 6. Partly dehydrated alunogen (triclinic, $Al_2O_3.3SO_3.16H_2O$) yielding monoclinic $Al_2O_3.3SO_3.13\frac{1}{2}H_2O$. [M.A. 8-278.]

Metahydroboracite. N. Y. Ikornikova and M. N. Godlevsky, 1941. Compt. Rend. (Doklady) Acad. Sci. URSS, vol. 33, p. 257 (metahydroboracite). Hydrous calcium and magnesium borate, $CaMgB_6O_{11}.11H_2O$, like hydroboracite but with more water. Synonym of inderborite (q.v.). [M.A. 8–341.]

Metaloparite. V. I. Gerasimovsky, 1941. Compt. Rend. (Doklady) Acad. Sci. URSS, vol. 33, p. 61 (metaloparite), p. 63 (hydroloparite). Hydrous titano-niobate of rare-earths pseudomorphous after loparite (10th List), from which it differs in containing water in place of alkalis. [M.A. 8–341.]

Metaquartz. I. D. Sedletzky, 1940. Compt. Rend. (Doklady) Acad. Sci. URSS, vol. 26, p. 241. An assumed intermediate stage in the passage of amorphous silica gel to chalcedony. [M.A. 8–146.]

Nagelschmidtite. R. L. Barrett and W. J. McCaughey, 1941. Amer. Min., Program and Abstracts, December 1941, p. 4; Amer. Min., 1942, vol. 27, p. 689. Calcium silico-phosphate $Ca_7Si_2P_2O_{16}$ as optically biaxial grains in basic slag. Named after Dr. Gunther Nagelschmidt (1906–) of Harpenden, Hertfordshire, who described the material in 1937. [M.A. 7–147, 8–312.]

Naurodite. W. von Knebel, 1903. [Sitz.-Ber. Phys.-Med. Soc. Erlangen, vol. 35, p. 213]; abstract in Neues Jahrb. Min., 1907, vol. i, p. 229 (Naurodit). A blue hornblende differing from glaucophane, riebeckite, crossite, and arfvedsonite in optical extinction-angle and pleochroism, occurring in naurodite-schist at Naurod, NW. of Wiesbaden, Germany. Named from the locality.

Nifesite. H. Löfquist and C. Benedicks, 1940. Jernkontorets Ann. Stockholl vol. 124, pp. 658, 682; K. Svenska Vetenskapsakad. Handl., 1941, ser. 3, vol. 1 no. 3, p. 43 (nifesit), p. 91 (nifesite). Nickel-iron sulphide consisting of a ve fine-grained aggregate of bravoite and pentlandite, occurring in native iron and pyrrhotine from Ovifak, Greenland. Named from the chemical symbols Ni, Fe, [M.A. 8–312.]

Nitrate-apatite. D. McConnell, 1938. Amer. Min., vol. 23, p. 8. 'The fa that a nitrate-apatite is not known does not weaken the hypothesis' that NO_3 groups may enter into the apatite structure.

Nordite. V. I. Gerasimovsky, 1941. Compt. Rend. (Doklady) Acad. S URSS, vol. 32, p. 496. Silicate of rare-earths, Na, Sr, Ca, Mn, as pale-brow orthorhombic crystals from the Kola peninsula, Russia. So named because its northern origin. [M.A. 8–279.]

Norilskite. O. E. Zvyagintzev, 1940. Compt. Rend. (Doklady) Acad. S URSS, vol. 26, p. 790. An alloy of platinum with iron, nickel, copper, palladium, found as grains and cubic crystals in alluvial deposits at Nori northern Siberia. Named from the locality. [M.A. 8–53, 341.]

Ovulite. W. H. Bucher, 1918. Journ. Geol. Chicago, vol. 26, p. 593. L. Déver Schweiz. Min. Petr. Mitt., 1940, vol. 20, p. 102. 'An individual grain of oolit From Latin ovulum, dim. of ovum. To replace the name ooide (Ooid, E. Ka kowsky, Zeits. Deutsch. Geol. Gesell., 1908, vol. 60, p. 72). The name ovuli was in use before 1848 for a fossil egg.

Parakalinepheline, Parakaliophilite. F. A. Bannister, 1942. Min. Mag vol. 26, p. 221. Alternative, but rejected, names for kalsilite (q.v.).

Paucilithionite. A. N. Winchell, 1941. Amer. Min., Program and Abstract December 1941, p. 26; Amer. Min., 1942, vol. 27, pp. 117, 235. A hypothetical en member $K_2Li_3Al_5Si_6O_{20}F_4$ which, together with polylithionite and protolithionit enters into the composition of lepidolite. Named from the Latin *paucus*, fe little.

Prokaolin. I. D. Sedletzky, 1940. Compt. Rend. (Doklady) Acad. Sc URSS, vol. 26, p. 241. An assumed amorphous weathering product passing pr gressively into kaolinite. [M.A. 8–146.]

Rankinite. C. E. Tilley, 1942. Min. Mag., vol. 26, p. 190. Tricalcium silicate, $3CaO.2SiO_2$, as monoclinic crystals in the dolerite-chalk contact at Scav Hill, Co. Antrim, and in blast-furnace slag. Named after George Atwater Rank (1884–), of Washington, D.C., formerly of the Geophysical Laboratory. [M. 8–229, 244.]

Robertsonite. F. V. Chukhrov, 1936. [Colloids in the earth's crust (Russ Acad. Sci. USSR, 1936, p. 83.] O. M. Shubnikova, Trans. Inst. Geol. Sci., Aca Sci. USSR, 1938 [i.e. 1940], no. 11 (Min. Geochem. Ser., no. 3), p. 3 (Робертсони Robertsonite). Colloidal zinc sulphide from Cherokee County, Kansas. Nam after James D. Robertson, who described the material (Amer. Journ. Sci., 189 ser. 3, vol. 40, p. 160). *See* Brunckite (15th List).

The same name, Robertsonite (E. Poitevin, Ann. Rep. Dept. Mines, Canad

1931 for 1929–30, pp. 19, 20), was provisionally given to a mineral from British Columbia, at first thought to be a new species.

Royite. N. L. Sharma, 1940. Proc. Indian Acad. Sci., Sect. B, vol. 12, p. 215. Flattened prisms of quartz of blade-like habit occurring on joint-planes of sandstones and shales in the Jhaira coal-field. Named after Professor S. K. Roy, of the Indian School of Mines, Dhanbad. [M.A. **8**–230.]

Saamite. M. I. Volkova and B. N. Melentiev, 1939. Compt. Rend. (Doklady) Acad. Sci. URSS, vol. 25, p. 122 (strontium apatite, saamite). A variety of apatite containing SrO (5·58 11·42 %) together with rare-earths (1·75 4·90 %) from the Kola peninsula, Russia. (Not the strontium-apatite of A. N. Winchell, 1927, 15th List.) [M.A. **8**–52.]

Sampleite. C. S. Hurlbut, 1942. Amer. Min., vol. 27, p. 586. Hydrous phosphate and chloride of copper, calcium, and sodium, $NaCaCu_5(PO_4)_4Cl.5H_2O$, as blue crusts of minute orthorhombic crystals. Named after Mr. Mat Sample of Chuquicamata, Chile, where the mineral was found. [M.A. **8**-309.]

Sarmientite. V. Angelelli and S. G. Gordon, 1941. Notulae Naturae, Acad. Nat. Sci. Philadelphia, no. 92; Science, New York, Sept. 26, 1941, vol. 94, suppl. p. 9. Hydrous arsenate and sulphate of ferric iron, $FeAsO_4.Fe(OH)SO_4.5H_2O$, as minute, lemon-yellow, monoclinic crystals, isomorphous with destinezite; in sulphate deposits from Argentina. Named after Domingo Faustino Sarmiento (1811 88), President of the Argentine Republic. [M.A. **8**–187.]

Selenocosalite. O. H. Ödman, 1941. Årsbok Sveriges Geol. Undersökning, vol. 35, no. 1, p. 87. A variety of cosalite containing Se 6·43 %, $Pb_2Bi_2(S,Se)_5$, from Boliden, Sweden. [M.A. **8**–311.]

Selenokobellite. O. H. Ödman, 1941. Årsbok Sveriges Geol. Undersökning, vol. 35, no. 1, p. 89. A variety of kobellite containing Se 4·78 5·74 %, $Pb_2(Bi,Sb)_2(S,Se)_5$, from Boliden, Sweden. [M.A. **8**-311.]

Shilkinite. G. V. Merkulova, 1939. [Mém. Soc. Russe Min., vol. 68, p. 559.] Abstract in Amer. Min., 1943, vol. 28, p. 62. $K_2O.4Al_2O_3.8SiO_2.4H_2O$, as green, fibrous and fan-shaped aggregates in pegmatite from Shilka river, Transbaikal. Named from the locality.

Sjögrenite. C. Frondel, 1940. Amer. Min., Program and Abstracts, December 1940, p. 6 (Sjogrenite); Amer. Min., 1941, vol. 26, p. 196 (Sjogrenite), p. 205 (Sjögrenite). Hydrous basic carbonate of magnesium and ferric iron, $Fe_3Mg_6(OH)_{16}CO_3.4H_2O$, as hexagonal scales dimorphous with the rhombohedral pyroaurite. Named after Sten Anders Hjalmar Sjögren (1856 1922) of Stockholm. [M.A. **8**–51, 99.]

Soda-heterosite. P. Quensel, 1937. Geol. För. Förh. Stockholm, vol. 59, p. 96 (Na-heterosite; 15th List, p. 645). G. L. English, Descriptive list of new minerals, 1939, p. 208 (Soda-heterosite). B. Mason, Geol. För. Förh. Stockholm, 1941, vol. 63, p. 161 (Na-heterosite). [M.A. **6** 486, **7**–313, **8**-180.]

Soda-triphylite. V. Ziegler, 1914. Bull. South Dakota School of Mines, no. 10, p. 192 (soda-triphylite), p. 193 (soda triphylite). A mineral from Black Hills, South Dakota, analysed by W. P. Headden in 1891 and described by him as being near triphylite. It was later named arrojadite by D. Guimarães (1925,

11th List) and headdenite by P. Quensel (1937, 14th List). B. Mason (Geol. F Förh. Stockholm, 1941, vol. 63, p. 132) points out that the earliest name so triphylite would suggest identity of the mineral with natrophilite, and he ad the name arrojadite: soda-triphylite — headdenite = arrojadite. [M.A. 3–1 6–486, 8–180.]

Sodium-illite. F. A. Bannister, 1943. Min. Mag., vol. 26, p. 304. Syno of brammallite (q.v.).

Sodium-jarosite. F. V. Chukhrov, P. E. Arest-Yakubovich, and N. A. Kozl 1940. Compt. Rend. (Doklady) Acad. Sci. URSS, vol. 28, p. 829 (sodi jarosites). Synonym of natrojarosite (3rd List). [M.A. 8–142.]

Sphærodialogite. A. W. Woodland, 1939. Quart. Journ. Geol. Soc. Lon vol. 95, p. 34. Rhodochrosite (= dialogite) as minute granular globules in We manganese ore. [M.A. 7–437.]

Spherite. W. H. Bucher, 1918. Journ. Geol. Chicago, vol. 26, p. 593. Sphe grains, including ovulite (q.v.) with concentric structure and spherulite radial structure.

Sterrettite. E. S. Larsen, 3rd, and A. Montgomery, 1940. Amer. Min., vol p. 513. Hydrous basic aluminium phosphate, $Al_6(PO_4)_4(OH)_6.5H_2O$, as min colourless, orthorhombic crystals in variscite nodules from Fairfield, U Named after Dr. Douglas Bovard Sterrett. Shown by F. A. Bannister (Min. M 26–131) to be identical with eggonite. [M.A. 8–3.]

Stibarsen. P. E. Wretblad, 1941. Geol. För. Förh. Stockholm, vol. pp. 38, 46 (Stibarsen, Allemontite II). Allemontite from Varuträsk, Sweden, the composition AsSb. Allemontite I consists of an eutectoid mixture of t with the Sb phase, and allemontite III with the As phase. [M.A. 8–98.]

Tantalohatchettolite. J. E. de Villiers, 1941. Amer. Min., vol. 26, p. 5 Microlite containing much uranium. [M.A. 8–188.]

Tantalo-rutile. A. B. Edwards, 1940. Proc. Austral. Inst. Mining & Meta no. 120, p. 735 (tantalo-rutile). To replace the name ilmenorutile for rutile c taining tantalum and niobium. [Min. Mag. 15–85; M.A. 8–307.]

Theophrastite. A. Breithaupt, 1849. Die Paragenesis der Mineralien, p. 2 (Theophrastit). Synonym of Nickelwismuthglanz (F. von Kobell, 1835) grünauite (J. Nicol, 1849) = saynite (F. von Kobell, 1853). Named after Th phrastus (*c.* 372–286 B.C.).

Titanclinohumite. F. Machatschki, 1930. Centralblatt Min., Abt. A, 19 p. 194 (Titanklinohumit). F. de Quervain, Schweiz. Min. Petr. Mitt., 19 vol. 18, p. 591. Synonym of titanolivine (A. Damour, 1879), titanhydrocli humite (9th List), and Klinolivin (12th List). [M.A. 8–85.]

Titan-låvenite. E. I. Kutukova, 1940. [Trans. Inst. Geol. Sci., Acad. S USSR, no. 31, Min. Geochem. Ser., no. 6, p. 23.] Abstract in Amer. Min., 19 vol. 26, p. 135 (Titan-lovenite). A variety of låvenite containing TiO_2 11·30 from the Kola peninsula.

Titanvesuvianite. L. L. Shilin, 1940. Compt. Rend. (Doklady) Acad. S URSS, vol. 29, p. 325 (titanvesuvianite). V. S. Myasnikov, ibid., 1940, vol.

446 (titaniferous vesuvianite). A variety of idocrase containing 4·59 % TiO_2. M.A. 8–100, 101.]

Treanorite. A. O. Woodford, J. D. Laudermilk, and E. H. Bailey, 1940. ull. Geol. Soc. Amer., vol. 51, p. 1965. A. O. Woodford, R. A. Crippen, and . B. Garner, Amer. Min., 1941, vol. 26, p. 375. An undescribed mineral similar allanite, from Crestmore, California. [M.A. 8–145.]

Tungomelane. P. F. Kerr, 1940. Bull. Geol. Soc. Amer., vol. 51, p. 1379. ungsten-bearing psilomelane (WO_3 1·54–2·78 %) from Golconda, Nevada. M.A. 8–310.]

Whitlockite. C. Frondel, 1940. Amer. Min., Program and Abstracts, Decemer 1940, p. 7; Amer. Min., 1941, vol. 26, pp. 145, 197. Calcium phosphate, $a_3(PO_4)_2$, with small amounts of Mg and Fe, as colourless rhombohedra from orth Groton, New Hampshire. Named after Mr. Herbert Percy Whitlock 1868) of the American Museum of Natural History, New York. [M.A. 8–52, 9, 232.]

Yttroparisite. E. I. Nefedov, 1941. Compt. Rend. (Doklady) Acad. Sci. RSS, 1941, vol. 32, p. 363. A variety of parisite containing much yttria, from dun-Chalon, Transbaikalia. [M.A. 8–279.]

SYSTEMATIC CLASSIFICATION OF NEW MINERALS[1]

Elements

tibarsen, AsSb.
Norilskite, Pt, Fe, Ni, Pd alloy.

Sulphides, etc.

Robertsonite, colloidal ZnS.
Vifesite, Ni–Fe sulphide.
Cobalt-löllingite = safflorite.
Selenocosalite, $Pb_2Bi_2(S,Se)_5$.
Selenokobellite, $Pb_2(Bi,Sb)_2(S,Se)_5$.

Haloids

Sadwaladerite, $Al(OH)_2Cl.4H_2O$.

Oxides

Tantalo-rutile = ilmenorutile.
Cryptomelane, var. psilomelane.
Tungomelane, var. psilomelane.

Hydroxides

Ferrohydrite, colloidal.
Hydrotungstite, $WO_3.2H_2O$.

Carbonates

Bemmelenite, colloidal $FeCO_3$.
Barbertonite, $Cr_3Mg_6(OH)_{16}CO_3.4H_2O$.
Manasseite, $Al_3Mg_6(OH)_{16}CO_3.4H_2O$.
Sjögrenite, $Fe_3Mg_6(OH)_{16}CO_3.4H_2O$.
Yttroparisite, var. parisite.

Sulphates

Calingastite, Zn-Cu-melanterite.
Meta-alunogen, $Al_2O_3.3SO_3.13\frac{1}{2}H_2O$.
Sodium-jarosite = natrojarosite.

Iodates

Bellingerite, $3Cu(IO_3)_2.2H_2O$.

Borates

Kurnakovite, $2MgO.3B_2O_3.13H_2O$.
Inderborite = Metahydroboracite } $CaMgB_6O_{11}.11H_2O$.

Phosphates, etc.

Whitlockite, $Ca_3(PO_4)_2$.
Mangan-hydroxyapatite, $(Ca,Mn,Fe)_{10}(PO_4)_6(OH)_2$.
Manganoxyapatite, $3(Ca,Mn)(PO_4)_2.CaO$.
Saamite, Sr-apatite.
Manganese-sicklerite, $(Li,Mn'',Fe''')PO_4$.
Ferri-turquoise, var. turquoise.
Clinobarrandite, $(Al,Fe)PO_4.2H_2O$.
Sterrettite, $Al_5(PO_4)_4(OH)_6.5H_2O$.
Bradleyite, $Na_3PO_4.MgCO_3$.
Samploite, $NaCaCu_5(PO_4)_4Cl.5H_2O$.
Sarmientite, $FeAsO_4.Fe(OH)SO_4.5H_2O$.
Nagelschmidtite, $Ca_7Si_2P_2O_{16}$.

[1] Only selected names given in the preceding alphabetical list are here included.

NIOBATES, ETC.

Columbomicrolite, var. microlite.
Tantalohatchettolite, var. microlite.
Metaloparite, hyd. loparite.
Djalmaite, hyd. tantalate U.

STANNATES

Hochschildite, $PbSnO_3.5–6H_2O$.

SILICATES

Barium-sanidine.
Ferrohypersthene.
Ferroaugite.
Ferrosalite.
Abkhazite, var. amphibole-asbestos.
Lamprobolite, basaltic hornblende.
Kalsilite, $KAlSiO_4$.
Rankinite, $3CaO.2SiO_2$.
Garnetoid
Grossularoid } $3CaO.Al_2O_3.2SiO_2.2H_2O$, &c
Hydrogarnet
Mellorite, sil. Fe''',Ca.
Nordite, sil. rare-earths, &c.
Paucilithionite, $K_2Li_3Al_5Si_6O_{23}F_4$.
Brammallite, sodium-illite.
Shilkinite, $K_2O.4Al_2O_3.8SiO_2.4H_2O$.
Ablykite, $RO.2R_2O_3.5SiO_2.6H_2O$.
Donbassite, $H_{14}Al_8Si_5O_{29}$.
Endellite = halloysite.
Hectorite = magnesium-bentonite.
Calcium-montmorillonite.
Elkonite, colloidal clay.

INDEX TO VOL. XXVI

[See also List of new mineral names (p. 334). Only the main items are here indexed: for fuller details see Index to Mineralogical Abstracts, vol. 8.]

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ERRATA AND ADDENDA

Mineralogical Magazine, vol. 20.

PAGE.	LINE.	
72	14	*For* NNE. *read* NNW.

Mineralogical Magazine, vol. 25.

lxiii	2	*For* 367 pages *read* 266 pages
657	col. 1	*Under* PEACOCK, (M.A.) *add* Parawollastonite (1935)

Mineralogical Magazine, vol. 26.

lxiv		incorrectly given as xiv
16	7	*For* Grüneau *read* Grünau
19	3*	*For* 1939 *read* 1839
—	6*	*For* 1938 *read* 1838
62	19*	*For* Larson *read* Larsen
102	9*	*For* (331) to (221) *read* (331) and (221)
313	Table III	To the list of K-Al phosphates *add* Leucophosphite, E. S. Simpson, 1932 [M.A. 5–148].
324	14*	*For* [110] *read* [1$\bar{1}$0]

* From bottom of page.

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NOTE

This eighth volume (1941–43) of *Mineralogical Abstracts* contains 1,501 abstracts. They are roughly grouped under the following headings:

Artificial Minerals (pp. 111, 253).
Bibliographies (p. 149).
Chemical Crystallography (p. 258).
Clays (pp. 79, 294).
Colour of Minerals (pp. 125, 264).
Crystal-optics (pp. 72, 206, 349).
Economic Minerals and Ore-deposits (pp. 36, 168, 245, 326).
Growth and Corrosion of Crystals (pp. 198, 261).
History and Biography (p. 147).
Instruments and Apparatus (pp. 76, 291).
Mathematical Crystallography (pp. 64, 343).
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Zeolites (p. 297).

In the preparation of the abstracts the indexing has been kept constantly in view. Many points receive a bare mention in the abstracts to ensure their inclusion in the index. It is hoped that by this means the searcher will be put in touch with the original literature. The Alphabetical Index (pp. 396–448) of Authors, subjects, and *Localities* is preceded by a Topographical Index (pp. 383–395).

ERRATA AND ADDENDA

PAGE.	LINE.	
		Mineralogical Abstracts, vol. 4.
15	7–8	*For* $3MgCl_2.3MgO.Al_2O_3.6H_2O$ *read* $2MgCl_2.3MgO.Al_2O_3.6H_2O$
581	Index	*Add* Koenenite, 15
		Mineralogical Abstracts, vol. 5.
45	2*	*For* M.A. **3**–520 *read* M.A. **2**–520
268	14*	*Add* Comm. Serv. Geol. Portugal, 1931 [i.e. 1932], vol. 17, pp. 31–56.
		Mineralogical Abstracts, vol. 6.
237	5–6	*For* paramorillonite *read* paramontmorillonite
266	12*	*For* HOFFMAN (J.) *read* HOFFMANN (J.)
333	5	*For* M.A. **5**–111, 280 *read* M.A. **4**–111, 280
		Mineralogical Abstracts, vol. 7.
122	16*	*For* M.A. **6**–366 *read* M.A. **6**–336
187	14*	*For* pp. 379–427 *read* pp. 379–428
559	6*	For *Loovzero* read *Lovozero*
		Mineralogical Abstracts, vol. 8.
4	16	*After* FESTER (A. G.) *add* [i.e. G. A.]
87	17*	*For* M.A. **5**–391 *read* M.A. **5**–390
99	16*	*For* 39·9 *read* 36·9
105	1	*For* QUERVAN *read* QUERVAIN
120	7	*For* BURRAGE *read* BURBAGE
173	1	*For Rudbánya read Rudabánya*
230	17	*For* GOTMAN (J. D.) *read* GOTMAN (Y. D.) ГОТМАН (Я. Д.) GOTMAN (J. D.)
265	17*	For *Lumineszenz analyse* read *Lumineszenzanalyse.*
344	20	*For* Sydney *read* Sidney

* From bottom of page.